Test #14

1. an ^{56}Fe nucleus has more binding energy per nucleon than any other nucleus in creation ✓

2. Pions are small particles that switches between nucleons. They are important in nuclear chemistry because the force they create when swapping from nucleons holds the nucleus together. ✓

3. The first atom is more stable ✓

4. The electron collided with a position ✓

5. only ^{12}C ✓, ^{145}Nd ✓, and ^{66}Zn ✓ are stable nuclei

6. ^{40}Ar is a light isotope which means it will cause a nuclear fusion ✓

21/21 ✓ 100%

7. $\frac{0.0993\,amu}{1}\left(\frac{1.6605\times10^{-27}\,kg}{1\,amu}\right) = 1.65\times10^{-28}\,kg$ ✓

$6(1.0087)+6(1.0073)$
$= 12.0960\,amu$
-11.9967
$= 0.0993\,amu$

$E = (1.65\times10^{-28})(3.00\times10^{8})^2 = 1.49\times10^{-11}\,J$ ✓

$\frac{1.49\times10^{-11}}{12} = 1.24\times10^{-12}\,J/nucleon$ ✓

8. $5.16\times10^{-12} = m(3.00\times10^{8})^2$

$\frac{5.16\times10^{-12}}{9\times10^{16}} = m$

$m = 5.73\times10^{-29}\,kg$ ✓

$\frac{5.73\times10^{-29}\,kg}{1}\left(\frac{1\,amu}{1.6605\times10^{-27}\,kg}\right)$

$= 0.0345\,amu$

$3(1.0073)+3(1.0087)$
$= 6.0480\,amu$
$-0.0345\,amu$
$= 6.0135\,amu$ ✓

9. $^{248}_{93}Np \rightarrow {}^{248}_{94}Pu + {}^{0}_{-1}e + {}^{0}_{0}\bar{\nu}$ ✓

10. $^{218}_{84}Po \rightarrow {}^{214}_{82}Pb + {}^{4}_{2}He$ ✓

11. $N = 44.0g\left(\frac{1}{2}\right)^{\frac{28.6}{14.3}}$

$N = 44.0g\left(\frac{1}{2}\right)^{2}$

$N = \frac{44.0}{11} = \boxed{11.0\,g}$ ✓

12.

$K \cdot 10.76 = \frac{0.693}{K} \cdot K$

$\frac{10.76K}{10.76} = \frac{0.693}{10.76}$ $\quad K = 0.0644$ half years ✓

$N = (15.0g)\left(e^{-(0.0644)(20.0)}\right)$

$= 15.0g\,(0.2758) = \boxed{4.1\,g}$ ✓